

lower part of city inundated; people of New Cumberland, on opposite side of river, compelled to flee to high ground for safety. Marietta, 11th, water 38 feet above low-water mark, streets flooded, river nearly a mile wide, much damage to bridges and buildings. Cleveland, 10th, highest water for many years; streets, wharves and warehouses flooded. Warren, 11th, Makoning river highest for many years, whole south end of city one vast lake, 1,500 people obliged to leave their dwellings, nearly all of the manufactories of the city were flooded, business generally suspended. New Comerstown, 11th, Tuscarawas river higher than for the past 30 years, railroad trains discontinued, bottom lands submerged and corn, hay, fodder and fences carried away. Dayton, 11th, highest water since the great flood of 1866; houses in northern part of city flooded; water rapidly approaching the southern portion, where many people left their houses for places of safety. Sidney, 11th, Miami river highest for 13 years. Port Jefferson, 11th, iron bridge carried away; much damage to other property. Chagrin Falls, 11th, Chagrin river highest since the flood of 1878; great damage to farmers along the bottoms. Youngstown, 11th, water highest since flood of 1878; 50 to 60 dwellings flooded and abandoned; business suspended; all communication cut off; all bridges throughout the county more or less damaged, causing a loss of about \$20,000. Bucyrus, 11th, Sandusky river above its banks; railroad bridge carried away; much damage in city and country round about. Mt. Vernon, 11th, Kokosing river highest for many years; great damage to bridges, fences, buildings and other property. Newark, 11th, heavies flood for many years; great destruction to county bridges; farmers suffered heavy losses. Lorain, 11th, Black river overflowed and highest for years; great damage to property in the low lands; several bridges carried away. Delaware, 11th, highest water ever known; several mill-dams carried away. *Pennsylvania*: Harrisburg, 10th, Susquehanna and Juniata rivers rose at the rate of two feet per hour; railroad tracks, for the distance of a mile, submerged to a depth of three feet. Meadville, 11th, highest water for years; 200 families compelled to abandon their houses; all cellars in the business part of the town flooded, causing great loss to merchants; all railroad and telegraphic communication cut off; several bridges carried away. Oil City, 11th, everything flooded; great damage to property; bridges and railroad tracks washed out. Washington, 11th, Chartier's creek overflowed; water rising 12 inches per hour; bridges, fences and buildings carried away. Woodville, 11th, water highest ever known; families compelled to leave their dwellings on horseback or in boats. Cannonsburg, 10th, highest water for many years; many dwellings abandoned for places of safety; great loss of property and much suffering. Hamilton, 11th, Juniata river highest for years, bridges carried away and all railroad and telegraphic communication cut off; throughout Dauphin county the damage done by small streams is very great, nearly all of the bridges have been destroyed and travel of all kinds seriously impeded. Wilksharre, 11th, Susquehanna river twenty feet above low-water mark, several bridges destroyed, the flats opposite the city were entirely under water and many telegraph poles were carried away. Newport, 11th, Juniata river very high, portion of bridge carried away, many families have abandoned their houses for places of safety. Schuylkill Haven, 11th, all of the lower portion of city submerged, water rose so rapidly that many people were obliged to take refuge in upper rooms of their houses until boats were procured to convey them to places of safety. Milford, 11th, Delaware river highest ever known, portion of city flooded, great destruction. *West Virginia*.—Parkersburg, 11th, river 32 feet above low-water mark and rising at the rate of five inches an hour. Pomeroy, 11th, river 34 feet above low-water mark and rising at the rate of six inches an hour. Point Pleasant, 11th, river 30 feet above low-water mark and rising rapidly. Charleston, 11th, Kanawha river 18 feet above low-water mark and rising six inches per hour. Hinton, 10th, New river 10 feet above low-water mark and rising. *New York*.—Elmira, 11th, Chemung river and other streams in vicinity overflowed, highest water for several years, hundreds of acres in eastern part of city submerged and many dwellings deserted, people passing about in boats and upon rafts. Port Jarvis, 11th, Delaware river overflowed, lower portion of city flooded, many families leaving for places of safety, much damage to property here and throughout the Delaware valley. Rondout, 11th, all railroad communication suspended, very heavy floods and much destruction to property in Dutchess and Columbia counties. Poughkeepsie, 11th, Wappinger's creek overflowed, several bridges carried away and much other damage done, on some of the country roads water was eight feet deep. Lackawaxen, 11th, river 25 feet above low-water mark and rushing by with fearful velocity carrying everything before it, much destruction of property. *North Carolina*.—Elsworth, 7th to 9th, all streams highest for years, large washouts and heavy land slides along railroad tracks, much damage in surrounding country. *District of Columbia*.—Washington, 12th, Potomac river overflowed, lower portion of city completely inundated, water highest ever known, people passed about in boats in front of the Metropolitan hotel and about the Baltimore and Potomac depot, houses and stores flooded above the first floors. *Maryland*.—Woodstock, 12th, Patapsco river highest for several years.

*High Tides*.—Pensacola, Fla., 6th, highest ever known, water rose five feet above high-water mark. New Orleans, 6th to 9th, very high. Indianola, 5th, unusually high. Galveston, 6th, very high. Mobile, 6th, remarkably high, flooding entire lower portion of city.

## TEMPERATURE OF WATER.

*The temperature of water*, as observed in rivers and harbors at Signal Service stations, with

the average depth at which observations were taken, is given in the table on the left-hand side of Chart No. III. Owing to ice and breakage of instruments, observations are wanting as follows: Alpena, Burlington, Buffalo, Chicago, Cleveland, Detroit, Duluth, Escanaba, Grand Haven, Milwaukee, Marquette, Sandusky and Toledo, from 1st to 28th; Mobile, 19th to 28th; Delaware Breakwater, 2nd to 8th; San Francisco, 3rd to 28th; Punta Rassa, 18th to 28th.

## ATMOSPHERIC ELECTRICITY.

*Thunder storms.*—In the various districts they were reported on the following dates: New England, 12th, 28th; Middle Atlantic States, 5th, 12th, 19th, 25th, 26th, 27th, 28th; South Atlantic States, 11th, 16th to 19th, 21st, 22nd, 23rd, 27th, 28th; Eastern Gulf States, 6th, 7th, 9th, 11th, 18th, 19th, 25th, 26th, 27th, 28th; Western Gulf States, including Texas, 5th, 6th, 8th, 9th, 10th, 11th, 15th, 16th, 17th, 18th, 19th, 20th, 26th; Ohio valley and Tennessee, 9th, 11th, 18th, 19th, 26th, 27th, 28th; Upper Lake region, 26th; Upper Mississippi valley, 17th, 20th, 26th, 27th, 28th; Lower Missouri valley, 5th, 6th, 19th, 20th, 26th, 27th; Arizona, 5th, 6th, 17th; California, 3rd, 15th, 16th. The most important storm of the month, except along the West Gulf coast from 6th to 9th, began in the Lower Missouri valley on the 26th, accompanying low area No. X, and as it passed eastward spread over the entire country from the lakes to the Gulf, reaching the Atlantic coast on the 27th and 28th, where it was experienced from Havana, Cuba, north-eastward to Maine. Storms of this class, gradually increasing in number and severity on the approach of spring, have been less frequent in the northern and more frequent in the southern sections of the country than during the month of February, 1880. As compared with the same month of previous years since 1873, the largest number were reported during February, 1881, the next largest in February, 1878, while in 1879 the number fell to near the minimum which occurred in 1875. It is very interesting, and still further there would seem to be an accordance with supposed laws of periodicity in connection with the recurrence of these storms from season to season, to note that in a comparative study of the month of February for the past nine years, it is found as an invariable feature, that about four-fifths of all the thunder-storms occurred between the 15th and 28th.

*Auroras.*—There were no remarkably brilliant displays during the month, but rather an unusual number were reported as having been witnessed over that portion of territory common to auroral manifestations, reaching from Maine westward to the 105th meridian. Displays of this nature were observed on the following dates: 1st, from stations in Nebraska northward to the northern boundary of the United States and in northern New England; 2nd, from Kansas northward to British America, and from Virginia northeastward to Maine; 20th, from Montana eastward to Lake Michigan and over New England. 26th, throughout Dakota and Minnesota, and in New Hampshire. 27th, from southern Kansas northwestward to Montana, northward to the northern boundary of Lake Superior and over New England. On all of these dates, and particularly the last three, extreme cloudiness prevailed over the Lower Lake region, preventing any display of auroras, even if they had occurred. From various stations local displays were witnessed on the following dates: Ft. Stevenson, Dak., 28th, a. m.; Spiritwood, Dak., 22nd, p. m.; St. Vincent, Minn., 16th, 20th, 22nd, p. m.; Duluth, 23rd, p. m.; Oswego, N. Y., 5th, a. m.; Burlington, Vt., 3rd, midnight to 12.15 a. m.; 3rd, 4.20 a. m. to daybreak; 6th, 2 a. m. to daybreak; 19th, 11.15 p. m. to midnight; Bangor, Me., 5th, p. m.; Eastport, 7th, 1 a. m. to 3 a. m.; Cambridge, Mass., 19th, 11 p. m.; Newburyport, Mass., 7th, 5 a. m.; 19th, p. m.; Gardiner, Me., 25th, midnight to 4 a. m.

*Zodiacal Light.*—Waterburg, N. Y., 19th, 21st; Flemington, W. Va., 9th; Bellefontaine, O., 19th; Clear Creek, Neb., 8th, 15th, 16th, 20th, 23rd to 27th; Somerset, Mass., 17th, 19th, 20th, 22nd to 25th; Cambridge, Mass., 15th, 16th, 17th, 19th, 22nd to 25th; Yates Center, Kan., 15th, 20th, 22nd, 23rd, 24th, 25th, 27th, 28th; Monticello, Ia., 21st, 22nd, 23rd; New Corydon, Ind., 16th, 19th, 21st, 23rd, 25th; St. Vincent, Minn., 15th, 16th, 17th, 20th, 24th; Springfield, Ill., 16th.

## OPTICAL PHENOMENA.

*Polar Bands.*—New Corydon, Ind., 17th, 21st, 25th; Yosemite valley, Cal., 14th; Clinton, Ia., 19th; Yates Center, Kan., 1st, 7th, 19th, 20th; Gardiner, Me., 8th, 15th, 20th; Auburn, N. H., 11th, 15th, 20th, 27th; Freehold, N. J., 7th; Vineland, N. J., 7th; Wytheville, Va., 6th, 20th, 25th; Prescott, Ariz., 8th; Little Rock, 1st; Chicago, 4th.

*Mirage.*—Corpus Christi, Tex., 18th, 1:35 p. m., Mustang Island plainly visible, although at a distance of 18 miles. Genoa, Nebr., 1st, 21st, 27th, 28th. Albuquerque, N. M., 16th. Indianola, 8th, 11th, 12th, 28th. Escanaba, 3rd, 4th.

*Halos* have been observed throughout the various districts with the usual frequency common to the winter months. Solar halos, accompanied with from two to four mock suns, were repeatedly witnessed at stations in the Rocky Mountain region, along the Eastern Slope and thence northeastward to the Upper Lake region. The most notable displays were reported from Denver and summit of Pike's Peak on the 14th, and from Menominee, Mich., on the 19th, the latter attended by five mock suns and a parhelic circle of 22° radius, was the most brilliant one of the month. Lunar